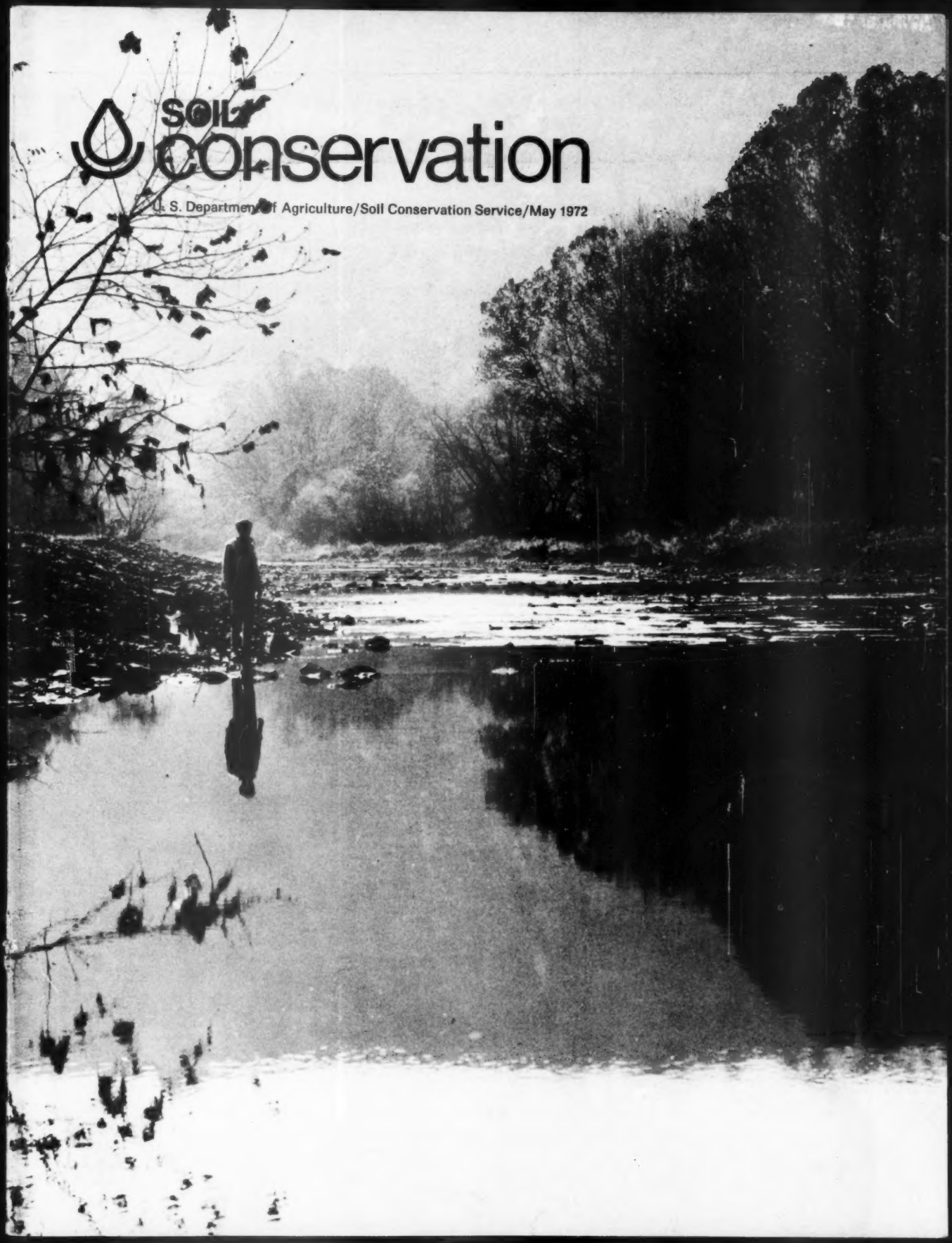


SOIL conservation

U. S. Department of Agriculture/Soil Conservation Service/May 1972

SOIL CONSERVATION
May 1972, Vol. 37, No. 10

What are you doing about the country's animal-waste problem? Animal-waste management systems are being sought that will make odor and water-pollution control possible without sacrificing efficiency and economy of operation.

This month in SOIL CONSERVATION, Charles E. Fogg discusses what SCS is doing in waste management. Other articles report the success of animal-waste disposal lagoons in Florida, Texas, and Alabama.

Another kind of environmental problem is discussed by Gordon Smith in his article about coal refuse piles.

COVER: No polluted water enters this serene stream in the Northern Panhandle Soil Conservation District, Marshall County, West Virginia. Photograph is by W. J. Melven.

219 Waste management—nationally
by Charles E. Fogg

222 Producing without polluting
by James N. Krider

224 Land grading: a pollution stopper
by James Martin

226 Instant landfill
by John M. Cross

228 Water-cure for wastes
by Vincent J. Price

230 New land from coal refuse
by Gordon S. Smith

232 Where's the dust?
by Stanley T. Moorhead

234 Conservation in action

237 Recon . . .

238 Review

239 Meetings

240 From the Administrator
Helping dispose of animal wastes

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

EARL L. BUTZ, Secretary of Agriculture
KENNETH E. GRANT, Administrator, Soil Conservation Service
PHILLIP A. CHAVEZ, Editor
GEORGIE A. KELLER, Production Editor

SOIL CONSERVATION is the official magazine of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. Use of funds for printing this publication approved by the Director of the Bureau of the Budget, July 17, 1968.
Reprint permission: Contents of this magazine may be reprinted without special permission. Credit is not required but is appreciated. Photos available on request.
Commercial names: Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.
Subscription: $2.00 per year, $2.50 foreign. Single copy 25 cents. Discount of 25 percent on orders of 100 or more sent to same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

Waste management—nationally

by Charles E. Fogg
Sanitary engineer, SCS
Washington, D.C.

This debris basin was used to trap sediment during construction of a large shopping center in Fairfax County, Virginia. After the shopping center was completed and the area stabilized, the basin was removed.

We—conservation districts and the Soil Conservation Service—are in the pollution abatement business. We have been for more than 35 years.

We have not been calling our work—mainly, installing erosion- and water-control measures—pollution abatement. But it is. In terms of volume, sediment remains the single greatest pollutant reaching surface waters. It not only fills our streams and harbors and increases the cost of treating domestic water supplies, but also it carries nitrogen, phosphorus, and other nutrients that often contribute to accelerated eutrophication of surface waters. Reducing the volume of sediment that reaches surface waters is pollution abatement.

Our work in helping to reduce sediment is not limited to agricultural areas. Increased activity

in erosion control in urban areas is also bringing pollution abatement benefits.

Let's take a look at what we're doing across the country in waste management. We prefer the term "waste management" to "pollution abatement." It more clearly describes our efforts in recycling wastes and in keeping them from reaching surface or underground water. And let's remember that a waste is not a pollutant unless it degrades air, soil, or water. Many wastes are just resources out-of-place.

Management of livestock and poultry wastes is receiving increased attention. These wastes were not considered major pollution threats until production methods began concentrating more and more animals on fewer and fewer acres. Livestock and poultry manure when widely dispersed on open range or pasture is recycled naturally by the soil and plant cover. But the concentrated manure from hundreds of animal units per acre far exceeds the recycling capacity of that acre. That is why carefully planned waste-management systems are needed to assist nature.

In spite of rapid trends towards these new production methods, it is estimated that less than 20 percent of the 1.75 billion tons of manure produced by livestock and poultry operations can be considered a pollution threat. Probably less than 1 percent is actually polluting surface or ground water.

Basic concepts of animal-waste management are essentially the same throughout the United States, Puerto Rico, and the Virgin Islands:

(1) Divert clean water away from concentrated production areas to prevent its pollution;

(2) Grade the production area to improve drainage and promote drying;

(3) Collect contaminated runoff;

(4) Evaporate or recycle contaminated runoff to the land and its plant cover;

(5) Collect and store manure solids and liquid manure from confined livestock and poultry operations until they can be safely spread on the land.

Waste-management techniques vary widely across the country.

In arid areas, the liquid part of wastes is readily evaporated, and the solid part is greatly reduced in volume right on the lot. Odor and absorption of ammonia by surface waters are often side problems.

In warm, humid areas, lagoons can effectively degrade wastes and reduce the volume to be recycled. Effluent from the lagoons generally should not be discharged directly into streams.

In cold, humid areas, waste-management systems generally include extensive holding facilities—ponds, pits, or tanks—to store wastes when the ground is frozen or snow covered and vegetation cannot utilize the waste nutrients.

Nearby residential or urban developments must be considered in selecting a waste-management system for any livestock or poultry enterprise. Animal wastes may only *smell* to farm owners or operators, but they *stink* to downwind neighbors. The use of anaerobic lagoons or the spreading of stored liquid manure on the land may not be feasible because of odors. Aerobic treatment, transporting the manure for spreading elsewhere, or other alternatives may be very costly.

Problems associated with waste management near urban areas can be varied and unpredictable. Take, for example, the modern dairy farmer near a residential area serving a large city. He employed the latest equipment and technology to handle his liquid manure—a completely enclosed storage tank having a 4- or 5-month capacity, an agitator, pumps, liquid manure spreader. He studied weather forecasts, wind direction, humidity. He carried out an extensive public relations program, informing neighbors of his waste-management system and his concern for the environment. When everything was just right he spread the waste on selected fields downwind from neighbors. That evening a neighbor complained. The neighbor's dog, much to the farmer's dismay, had found that a field spread with liquid manure was an excellent place to roll and romp before going back to his nicely carpeted home.

SCS, through conservation districts, assists industries and communities and their consultants in recycling to the land and its plant cover effluent and sludge from waste-treatment plants. Conventional primary and secondary waste-treatment plants do not remove a high percentage of the nutrients contained in wastes. Excess nitrogen and phosphorus are blamed for accelerating the process of eutrophication in surface waters. Where eutrophication of receiving waters is a problem, many communities are installing tertiary treatment facilities for removing nutrients from wastes. One method of tertiary treatment, gaining in popularity, is applying effluent from a secondary waste-treatment plant on the land. This method is not a panacea but is worth considering where sufficient land is available and the soils are suitable.

Basic to recycling wastes to the land are:

(1) Capability of soils to safely assimilate wastes;

(2) Ability of selected vegetation to utilize nutrients;

(3) Knowledge of limiting amounts of waste components that can safely be applied.

We assist industries, communities, and individuals planning to recycle wastes to the land by providing soil surveys and infor-

mation regarding: site selection, soil and plant limitations, liquid waste application rates and management, and site protection.

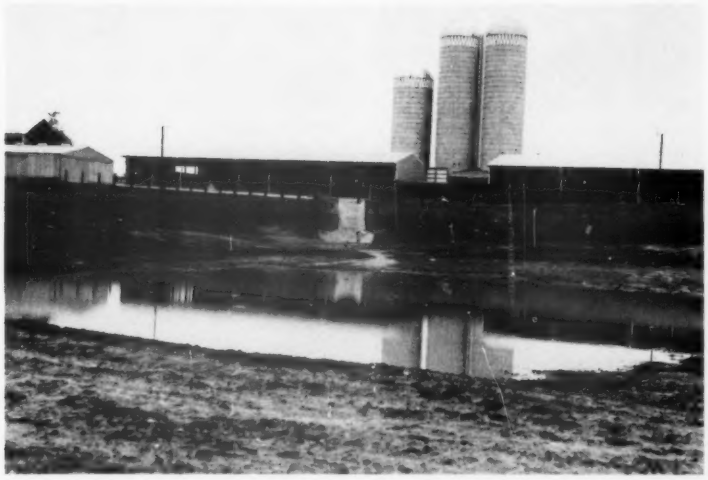
System design and compliance with appropriate health and water-quality regulations remain the responsibility of each industry or community and its consultant.

We also assist communities and their consultants in planning sanitary landfills. Our soil surveys and interpretations are useful in selecting from many potential sites those few warranting detailed investigation. This can save many dollars by eliminating the cost of investigating poor sites. And our recommendations on erosion- and water-control measures can be helpful in site development, including protection from runoff and wind erosion as well as vegetation for screening and site protection.

Soil surveys do not take the place of detailed geologic investigations for determining groundwater depth; quality, volume, and direction of flow; depth to bedrock; and quantity of material available for landfill operations.

Detailed engineering design is required to give proper consideration to volume and types of trash to be handled, collection routes, access, traffic patterns, neighborhoods, zoning, deposit regulations, leachate problems and possible treatment, availability of utilities, fire control, and after-use of the sanitary landfill site. Once again, design and compliance with regulations remain the responsibility of the community and its consultant.

The foregoing are some of the ways in which conservation districts and SCS are presently involved in waste management across the country. We must prepare ourselves for a more active role in these and many other areas of environmental quality improvement in the years ahead. ♦



(Top) In a trench type sanitary landfill, like this one near Ada, Oklahoma, refuse is compacted and covered daily with a layer of soil.
(Center) This pond collects polluted runoff from a modern, paved beef feedlot in Cass County, Michigan. The runoff in the pond is recycled, by irrigation, to cropland. Solid manure is scraped from the feedlot and spread on the land.
(Bottom) This lagoon in Russellville, Arkansas, was built to treat poultry processing wastes. Three of six aerators are shown.

Producing without polluting

by James N. Krider
Assistant state conservation engineer, SCS
Gainesville, Florida

It was 1970 when get-tough pollution-control legislation began to emerge in Florida. In the agricultural sector, this new legislation posed the greatest threat to the dairy industry. But the positive response of Florida dairymen has put them in the forefront among all industries in leading the way to compliance.

P. L. Synder, owner of the Sunnyhill Dairy near DeLeon Springs in Volusia County, was one of the pioneers in a program that stresses "being good neighbors with the environment."

"Early in 1970, the alternatives were not too desirable," says Snyder. "Most of the talk was about the kind of sewage treatment used by municipalities. Those systems are costly to build and to operate. Dairymen had to find less costly facilities or face the prospect of going out of business."

Snyder, long a cooperator with the Volusia Conservation District, learned about a new approach to animal-waste treatment—the lagoon system—through the district. He and his dairy manager, Alvin Gephart, decided that when design criteria became available the Sunnyhill Dairy would be one of the first in Florida to try the lagoons.

The dairy's adequate land area, soils, topography, and grassland

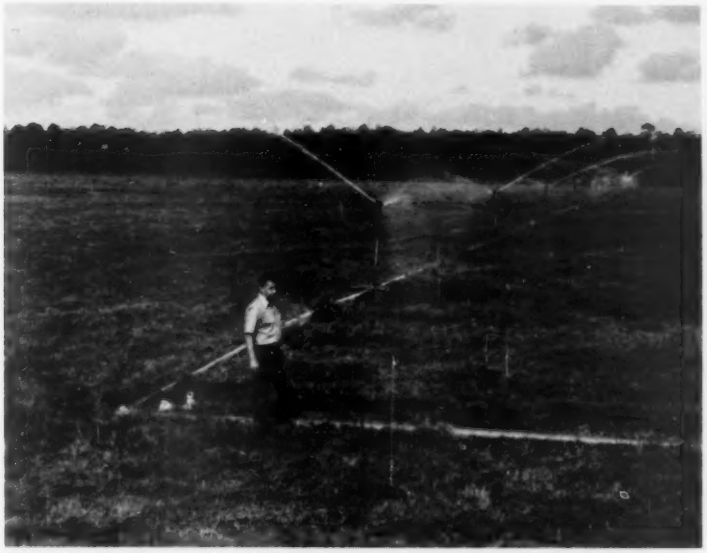
management program made it easier for the Soil Conservation Service to design the waste-treatment system.

The 484 acres range from level to gently rolling hills; the soils are sandy to sandy loam. The principal grass crop is Pensacola bahiagrass, which is overseeded with ryegrass for winter grazing. One thousand cows are held on nearby pastures between twice-a-day milkings. More than 78,000 gallons of water are used each day for washing the cows before each milking and cleaning the cow-holding areas after milking.

Snyder's waste-treatment system consists of three separate measures: an anaerobic lagoon, a holding lagoon, and a system for distributing the effluent on the land.

Wash water and its waste load are flushed through a low-velocity open ditch and dropped through a corrugated metal pipe into the anaerobic lagoon. There it takes 15 days for the biological reduction of solids. Tests have shown that this treatment provides as much as a 90 percent reduction in biochemical oxygen demand. Snyder's lagoon is 535 feet long, 100 feet wide, and 15 feet deep, which is adequate for his milking herd.

In the second stage, gravity pulls the effluent through a corrugated metal pipe into the holding pond where it is held for 7 days. Further treatment does take place in this pond, but the pond serves primarily as a storage basin for water that cannot be disposed of during periods of excess rainfall. It also helps to avoid continuous overflow.



Al Gephart, Sunnyhill's manager, looks over the sprinkler system which irrigates 44 acres of bahiagrass pasture.

(Opposite page) Sunnyhill Dairy's waste-treatment system consists of three separate measures: an anaerobic lagoon, bottom left; a holding lagoon, top right; and a sprinkler system to distribute the effluent on the adjacent land.

The final step in the treatment process is a modern adaptation of the age-old practice of applying manure to the land as fertilizer. Although wastes in the detention basin have essentially been degraded, the effluent contains substantial quantities of plant nutrients. Gephart's objective is to dispose of the animal wastes, but he recognizes the benefits from the supplemental plant nutrients.

A pump and diesel power unit were installed to get the effluent from the detention pond to 44 acres of bahiagrass pasture, subdivided to allow for rotating the applications.

The effluent is pumped to the pasture through a pipeline along which are located a series of portable lateral lines at 100-foot intervals. Each lateral line has impact-type sprinklers along its length. Gephart operates two laterals at a time for 4 hours, then activates two other laterals on the same side of the pipeline for a similar period. This process is continued on one side of the pipeline until half the field is irrigated. The lines are then moved to the other side of the pipeline, and irrigation continues for the other half of the field. The effluent is supplemented from a nearby 10-inch well to provide sufficient irrigation water.

To date, 67 lagoon waste-treatment systems, serving more than 42,000 dairy cows, have been installed on dairy farms in the state. The largest system serves a herd of 1,950 cows. With an estimated 271,000 dairy cows in Florida, a sizable job remains to be done. But with people like Snyder and Gephart, who are willing to be innovative, the job will be an easier one. ♦

Land grading: a pollution stopper

by James Martin
Area engineer, SCS
Crowley, Louisiana

Most cane farmers in Louisiana know that land grading puts dollars in their pockets, but few realize that it puts quality into the environment.

Stan Rodrigue, manager of Goldmine Plantation in St. John Parish, a long-time cooperator with the Crescent Soil and Water Conservation District, and an ASC county committeeman, helped pioneer land grading in Louisiana's cane area. He graded the first area on Goldmine in 1963 and since then has graded 447 of the plantation's 900 cropping acres. "We plan to have all of the cropland graded," he said, "as weather, equipment, and open land permit."

Land grading on the Goldmine Plantation has reduced erosion and kept pollution-causing sediment out of water areas. Some slopes have been reduced, and ditches and water overfalls have been eliminated. Grade stabilization structures are used on graded land to keep soil from "eating back."

Grading has cut down the amount of herbicides needed to control johnsongrass on Goldmine. Before land grading, 2 of every 20 acres were breeding grounds for johnsongrass because of ditches or headlands. And when ditches were cleaned out the johnsongrass rhizomes and seeds scattered into the fields. Now, after land grading, ditches or headlands are found only on half an acre out of 20. The land formerly in ditches is now cultivated.

Five miles of lateral V-ditches will replace about 56 miles of split ditches, cross ditches, and main ditches. In the V-ditches, johnsongrass is kept under control by close clipping and spot spraying if needed.

By eliminating the split ditches, the johnsongrass seed spots have been reduced, and consequently there is less johnsongrass in the

fields. "Before land grading," says Rodrigue, "we had to apply chemicals on the entire field to keep the grass under control. Now, spot spraying will do it."

Until a few years ago split ditches were the only drainage system used in Louisiana's cane area. Split ditches kept 5 to 15 percent of a canefield out of cultivation. But land grading has changed that.

Erosion occurs with the use of split ditches, partly because of the overfalls where shallow quarter-drains in the fields empty into the deeper split ditches. There are about 30 of these overfalls on a 20-acre plot. Also, the steep side slopes of split ditches erode and often cave in.

(Opposite page) Land grading in Louisiana's sugarcane area has resulted in better drainage and less erosion.
(Above) Lateral V-ditches like this are replacing about 56 miles of split ditches, cross ditches, and main ditches on the Goldmine Plantation.
(Left) Land grading is eliminating split ditches like this. The steep side slopes of the ditches erode and often cave in. Generally, there is a heavy growth of johnsongrass along each side of the ditches, and the rhizomes and seed infest the adjoining fields.

The Soil Conservation Service has assisted Rodrigue and other cane farmers in planning drainage and water-control systems and in laying out grading work.

"Land grading has helped greatly to reduce the silt originating on the Goldmine Plantation," comments Rodrigue. "But we're still not where we want to be. As more and more land is graded, there will be less silt to pollute our streams and less chemicals on our fields to control johnsongrass." ♦

Instant landfill

getting rid of trash for 20 cents a year

by John M. Cross
Information specialist, SCS
Lincoln, Nebraska

WHAT A DUMP! Warren Rice, left, Merwin Fricke, center, and Jim Eriksen are inspecting the sanitary landfill established in abandoned gravel pits on the Fricke farm. (Opposite page) The area around the gravel pits was protected by native grasses, but the pits had been a source of sediment.

Adams County, Nebraska, has a sanitary landfill. People outside Hastings have a place to dump their trash. Merwin Fricke is getting rid of some old gravel pits. Thirty-Two Mile Creek watershed is losing a source of sediment. All of this is taking place at the same time.

There are 30,000 people in Adams County; 24,000 of them live in Hastings. Hastings has its own solid-waste disposal system, but five other small towns in the county and the people in rural areas have had no way to dispose of trash. An open dump near the town of Holstein needed to be closed, for a number of reasons.

Dumping of trash along roadsides and in streams was a problem that Adams County supervisors were under pressure to solve. So when they heard that directors of the Thirty-Two Mile Creek Watershed Project bought a 160-acre farm on which to build a flood-control structure, they asked to locate a sanitary landfill on the same property.

There were a lot of good reasons why the watershed project directors didn't want a landfill near a flood-control structure, but they didn't want to just say no and drop the matter. After all, some of the objectives of the watershed project—clean environment and natural beauty—were the same as those of the county government. But the land for the structure had been bought with state loan funds and would be sold in 5 years. And wildlife plantings and native grass seedings on the land might suffer.

Warren Rice, manager of the

Adams Soil and Water Conservation District, decided to look around for a site to offer as an alternative. Knowing that Merwin Fricke, a director of the Thirty-Two Mile Creek Watershed Project, wanted his old gravel pits filled, Rice saw this as an opportunity for satisfying two needs.

The oldest of these pits had not been worked for 40 years. The other was active 20 years ago, and both were eyesores. They were adding to the sediment going into nearby Thirty-Two Mile Creek. The land around the pits had been seeded to native grasses in 1967, under Fricke's Great Plains Conservation Program contract, and that land was tied down. But the pits were a problem.

Surveys made by the Soil Conservation Service indicated that Fricke's pits had a capacity for about 20 years of use as a landfill. SCS district conservationist Jim Eriksen checked the soils, the amount of fill material needed, and the requirements for reseeding to grass.

So, for a fee of $1 for 5 years, Adams County supervisors have leased Fricke's old gravel pits. They have agreed to maintain health standards and to seed the completed fills to grass. Two days a week, Wednesdays and Sundays, anyone in the county outside of Hastings can bring their refuse to the only sanitary landfill in Adams County.

The county keeps a dozer and operator at the landfill when it is open. The area has been fenced, and a locked gate controls access when the landfill is closed.

In 1971 Fricke Farms, Inc., won the Honor Farm award presented by the Adams Soil and Water Conservation District for outstanding conservation accomplishments. Getting rid of the gravel pits somehow seems to be a final touch in land use, preceded by such practices as wildlife habitat plantings, grass seedings, ponds, diversions, and irrigation systems. Agreeing to provide the county with a landfill for 20¢ a year goes along with Fricke's other public spirited activity.

Fricke's father sold gravel from those pits 30 years ago. Fricke will sell beef from them someday. Meanwhile a lot of tin cans, paper, and other solid wastes will be covered forever by bluestem sod. And Thirty-Two Mile Creek will be a little cleaner. ♦

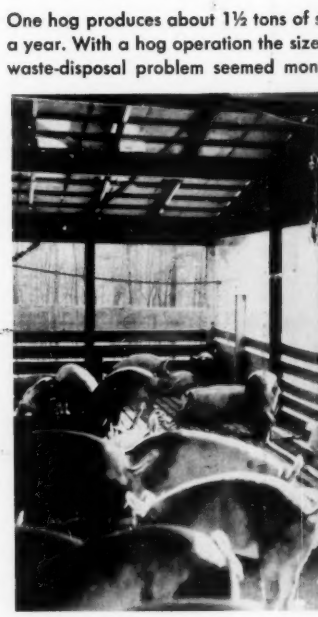
Water-cure for wastes

by Vincent J. Price
Information Division, SCS
Washington, D.C.

The waste production from livestock and poultry in the United States is equal to that of a human population of 1.9 billion. A number of complex waste management systems are feasible. In Alabama, a concerted effort to solve the animal-waste problem through disposal lagoons is having promising results. ♦

S. L. Cooke, on the right, a farmer in Marshall County shown here talking to district conservationist Byron Oliver, had hog problems a few years ago.

One hog produces about 1½ tons of s
a year. With a hog operation the size
waste-disposal problem seemed mon



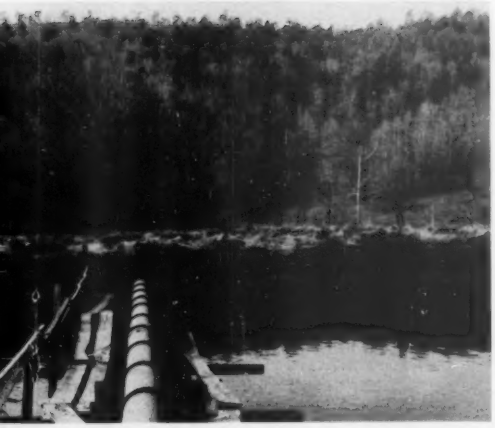
The P. G. Cowden dairy farm in Blount County also had a waste-disposal problem. And a proposed expansion of livestock operations to 200 cows would surely increase it.

Now animal wastes are taken care of by this 8-inch clay pipe. The wastes are diverted into the pipe and empty into . . .

This SCS-designed lagoon. Th
contains 65,296 cubic-feet of
The $1,238 cost of materials
Rural Environmental Assistanc

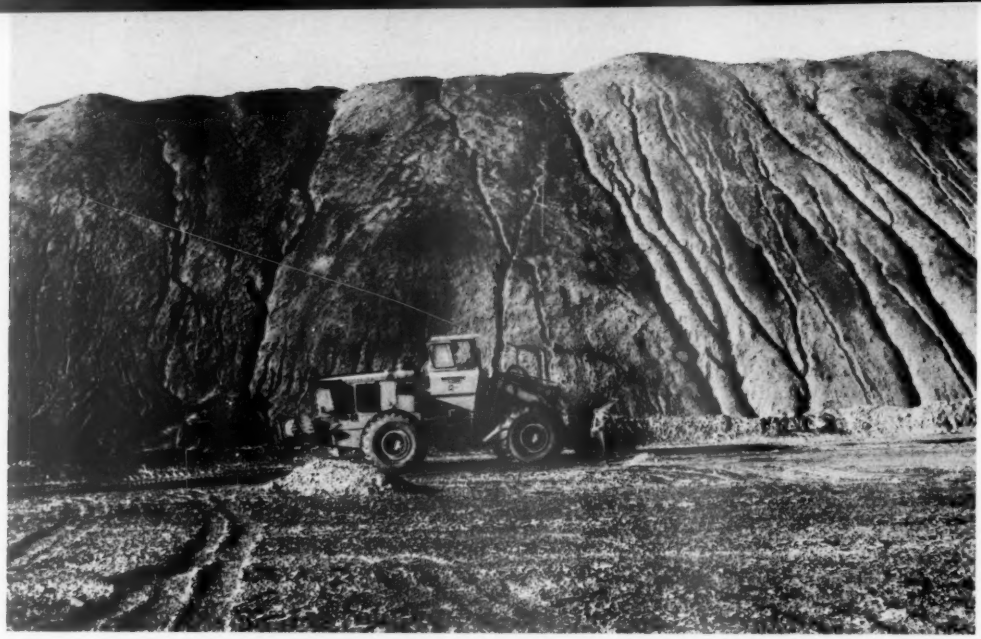
ns of solid and liquid wastes
e size of Cooke's, the
l monumental. One solution . . .

An SCS-designed lagoon. This 185,452 cubic-foot, $1,400 lagoon can adequately dispose of the wastes produced by Cooke's hogs. The banks of the lagoon are lined with bermudagrass. There is an overload spillway, but it has not been needed; there is no odor problem. The hoghouse is built out over the lagoon for easy waste disposal.



n. The lagoon measures 75 feet by 15 feet by 8 feet and
ɔt of water—300 cubic-feet per animal plus a safety margin.
ials and earthmoving was shared by Cowden and the
stance Program.

Even a small livestock farm can use a disposal lagoon. Lavoid Gullion's sow-and-pig operation involved 20 animals; yet the waste problem was large enough to prompt the Marshall County farmer to install this lagoon which is connected to the hoghouse by a disposal pipe. Kentucky 31 tall fescue lines the lagoon banks.



Coal mining company builds

New land from coal refuse

by Gordon S. Smith
Public information specialist, SCS
Upper Darby, Pennsylvania

In the hills of West Virginia, where a level piece of land sells for a premium price, a new method of forming coal refuse piles holds a promise of turning this land-use problem into useful real estate.

Instead of maintaining an eroding eyesore, Idamay Coal Mine No. 44, in Marion County, has stabilized a one-time refuse pile with grass and trees. A new plastics industry has located on 8 acres of the pile's 60-acre flattop.

Refuse piles—the mountains of slate, shale, and sandstone separated from the deep-mined coal—have been unsightly trademarks of the coal industry for years. In past decades, waste material was trucked to nearby dumping sites. Over a period of years, a refuse pile grew, often as high as the surrounding hills. Rain hitting the raw slopes washed the loose material into the stream below. Spontaneous combustion often set the refuse afire deep inside the piles, sending foul-smelling smoke across the landscape. Rust-red, acid mine water often seeped from the piles to further pollute the streams. Sometimes a massive wet refuse pile would slip and separate causing added problems.

Thanks to the resourceful ingenuity of some mine operators, refuse piles have begun to take on a new look. A few piles are being formed in a way that ends pollution hazards of the past and improves the value of the land.

Idamay Mine No. 44, operated by Bethlehem Mines Corporation, a subsidiary of Bethlehem Steel Corporation, first tackled the problem. Today the company owns more than 100 acres of land that was formed from a refuse pile. Sixty of these acres are leveled and revegetated land.

The mine's land-improvement effort started about 6 years ago when Beryl Toothman, outside foreman of the Idamay mine, discussed the problem with Law Helmick, SCS district conservationist in Marion County. As a cooperator with the Monongahela Soil Conservation District, the mining company had received technical planning aid from Helmick in the past.

Helmick drew up a plan, which Toothman put into action after approval from Bethlehem Mines' officials.

On the site for a new refuse pile, 150 feet of hillside was

(Above) Coal refuse is dumped here and spread out and leveled. When a layer is 15 feet deep it is covered with an 18-inch layer of soil. An uncontrolled, older refuse pile is in the background.
(Right) A cover of switchgrass and 'Alta' fescue provides excellent protection for the refuse pile.
(Right, bottom) Thousands of trees dot the top of this conservation planned refuse pile. The trees and grass block erosion and hold the refuse in place.

shaved off to provide some needed earthfill and to form a better anchor for the mine refuse. A bulldozer spread the mine refuse, making an even, 15-foot-thick layer. This was topped with an 18-inch layer of soil. The operation was repeated—layers of refuse alternating with earthfill. The sides of the pile were sloped to fit the natural contour of the surrounding landscape and covered with soil. As the pile grew upward, the slopes were protected with a seeding of switchgrass, 'Alta' fescue, perennial ryegrass, and yucca. A hydromulcher spread a mixture of paper pulp, fertilizer, and water as a base for the seeding.

When the refuse pile reached a height of 80 feet above the base, the top was covered with soil and seeded.

Plant materials for the initial field trials were provided by an SCS plant materials center. Under a Monongahela Soil Conservation District contract, approximately 4,000 trees were planted on the slopes of the pile. Bristly locust, European alder, speckled alder, and mountain-ash were used in a survival test. Crownvetch also was planted as part of the experiment to find suitable plants for the site. Later, 5,000 white pine, 5,000 Virginia pine, and 2,000 black locust trees were planted.

In addition to the district contract plantings, the coal company planted more than 4,000 Virginia pine, locust, European black alder, and autumn olive.

Most of the trees and grass have survived to form a protective cover over the flattopped refuse pile.

Helmick's plan included a desilting basin at the base of the pile. Mine sludge, made up of fine refuse particles, is pumped into the basin from the coal preparation plant. When the basin fills completely with solid refuse, it will be covered with a layer of soil, becoming a useful area of level land.

In summing up, Helmick says, "Approximately 75 acres of the mine refuse dump are now covered with trees. An additional 60 acres have a good stand of grass. The layers of soil stabilize the pile, smother possible spontaneous combustion, and cut off seepage at the bottom of the pile.

"With an improved road leading into the area, the site is ideal for the new plastics company, which is bringing new employment to this community. We hope other industries will consider this site."

Asked about the cost of the refuse pile improvement project, Beryl Toothman replied, "We consider it part of the normal upkeep of the mine operation. Actual costs of improving the pile will be regained from the increased value of that land."

With minor variations, the refuse pile improvement practice is being followed by other deep-mining companies in West Virginia, Pennsylvania, Ohio, and Kentucky. The practice is considered a sound investment in natural resource management and a solution to many pollution problems.

The useless refuse piles of the past may someday be replaced by acres of useful land. ♦

Where's the dust?

by Stanley T. Moorhead
Project engineer, SCS
Santa Rosa, California

In 1969, people watching channel construction along Santa Rosa Creek in northern California nearly choked in talclike dust.

In 1970 and 1971, as work progressed on the Central Sonoma (Public Law 566) project, people breathed freely and had a clear view of channel construction along Santa Rosa Creek and Ducker Creek.

Where did the dust go?

Mud in winter and dust in summer seemingly are inevitable on construction sites. When large

earthmovers, huge crawler tractors, and big trucks—the whole panoply of modern construction—descend on an area and begin work, mud immediately gets tracked around or dust begins to rise.

How much dust is too much? It's hard to keep dust at an acceptable level when there isn't a way to measure it. Only when dust fallout can be measured accurately will the contractor be able to control dust pollution.

During the 1969 construction season, residents of the Santa Rosa Creek area had to endure a plague of dust. Swimming pools had to be cleaned daily. Clothes freshly laundered and hung out to dry had to be washed over again. Twice-a-day housecleaning and gritty food became commonplace. Not hard to see why there were complaints!

In 1969, the Sonoma County Water Agency and the Soil Conservation Service worked with the San Francisco Bay Area Pollution Control District in developing specifications and equipment to measure dust arising from construction work and in setting dust tolerances. Dust-pollution tolerance was set at 2 grams per square meter per day, including the half-a-gram background amount. Two grams per day were considered tolerable, though on the high side; future tolerance levels probably will be lower.

Equipment was available for taking standard monthly, jar-sample measurements of dustfall but not for taking daily samples needed to measure accurately the dust raised during construction.

Ray Morton, an SCS inspector, exhibits a "dust collector," used for taking daily samples needed to measure the dust raised at a construction site.
(Opposite page, top) A cloud of dust rises from construction work along Ducker Creek.
(Opposite page, bottom) No dust here where good construction practices are being followed and dust-tolerance levels have been set.

The agencies determined that a flat pan, lined with plastic film, could collect the dust when properly protected from wind. A protector box and stand were developed, and the measurement methods that had been worked out showed accurately the amount of dust collected daily. The daily samples checked out well against the monthly samples.

When the Blasi-Engleke Company began work on Santa Rosa Creek in the spring of 1970, dust-pollution tolerances were written into the contract.

Where did the dust go? The dust didn't go anywhere, of course. It was kept in place by good construction practices.

Thanks to agency-contractor cooperation, at least a few Santa Rosa residents are no longer under a cloud of dust. ♦

conservation in action

Zero runoff into Texas streams

In Texas, Soil Conservation Service engineers who are designing feedlot pollution abatement systems have a lofty goal: zero runoff into Texas streams.

The Texas Water Quality Board has permit and registration requirements for operators of dairy, swine, and cattle feedlots. SCS has been asked to provide engineering assistance on 159 feedlots. To date, plans are complete on 78 feedlots and are in various stages of design on the remaining 81.

To find out how feedlot pollution abatement systems are working in Texas, I talked to Barry Moore, co-owner and operator of a feedlot at Hamlin.

"Our system was designed to comply with requirements set up by the Texas Water Quality Board," Moore said. "The board started regulating feedlots early in 1970, but we had been concerned about pollution long before that. We think keeping feedlot runoff under control is part of being a good neighbor. We wouldn't want someone else's waste water draining onto our land, and we don't intend to allow polluted water from our feedlot to drain onto a neighbor's land."

Moore pointed out that the 2,800-head cattle feedlot was built with runoff control in mind. The feedlot is on the brow of a hill, so there is no outside water entering the area.

A diversion terrace below the feedlot collects the runoff and empties it into one of two holding pits. The two pits can store more than 6 inches of runoff. Their capacity of 8.4 acre-feet is expected to handle all the runoff that might occur during the heaviest 24-hour rain that can be expected once every 25 years.

The water is pumped out of the pits and is used to irrigate adjacent land that has been leveled, bordered, and established to coastal bermudagrass. Also, pipeline from the pits carries water over a hill where additional bermudagrass can be irrigated as needed to help keep the pits empty. Nearly 20 acres in all can be irrigated, an area slightly larger than the feedlot.

Moore's conservation plan, worked out with the help of Pat Henson of the Anson SCS office and the California Creek Soil and Water Conservation District, calls for the parallel terracing this year of 140 acres of cropland adjacent to the feedlot. Eventually, most of the 600-acre farm will have parallel, level terraces with blocked ends. The terraces will be built from the back side, thus making the land between the terraces almost level. Henson estimates that on such land no runoff will occur from an 8-inch rain. Manure from the feedlot will be spread on this semileveled waste-disposal area.

A waterway has been built at one end of the farm to keep out-

On this feedlot near Hamlin, Texas, polluted water runs into a diversion terrace below the feedlot and empties into the holding ponds on the left. The water is used to irrigate the adjacent pasture, which has been leveled and bordered.

side water from entering a field to be irrigated from the holding ponds.

"Frankly, I don't know what I'd have done if it hadn't been for SCS help," admits Moore. "Henson called in the area engineer, Bob Gray from Abilene, and the two of them helped me draw up my plan. After we completed the engineering designs and plans, getting my permit from the Texas Water Quality Board was fairly simple."

Moore received cost-share assistance for the waterway, the diversion terrace, the two holding pits, and the land leveling through the Rural Environmental Assistance Program administered by the Agricultural Stabilization and Conservation Service.

Moore's feedlot has been operating at near capacity ever since he started accepting cattle early in 1971. His pollution abatement system keeps his feedlot wastes and runoff at home and helps make him a "good neighbor." —DALE D. ALLEN, *Public information officer, SCS, Temple, Tex.* ♦

Environmental information center

The crusade for a better environment ushered in a massive demand for information about air, water, soil, woodland, and wildlife. Conservation agencies are being pressed for speakers, films, and publications by schools, civic groups, garden clubs, and the general public. To help narrow this information gap, Pennsylvania's Westmoreland County Conservation District set up an Environmental Information Center in a room adjoining the district's office in Greensburg. The center is manned entirely by volunteers.

Mrs. Carol Pollock, volunteer director of Westmoreland County's Environmental Information Center.

There is a great deal of interest in the center, Mrs. Carol Pollock, who directs it, will tell you. "This is the first such center in the area. It has been open less than a year, and already we have had to extend our hours from the usual 8:30 a.m. to 4:30 p.m. to several evenings a week and Saturday to better serve our county's students. In addition to the students who come in, call, or write, we serve about 200 other people a month including elementary, secondary, and college teachers; sportsmen, farmers, homemakers, Scout groups, and civic clubs. We like to feel that we are a catalyst for people and their environmental problems," emphasizes Mrs. Pollock, who also helps her husband John operate a farm near Latrobe.

The center is well stocked with hundreds of publications with information ranging from ways to invite birds to your home to tips on selecting soils for house sites or commercial areas. The latest books on ecology, slide sets, and films are available on a loan basis to residents of the county, who have most of the environmental problems associated with a rapidly developing community.

A very popular publication is the *Directory of Environmental Information*, a 40-page booklet that was the 5-year dream of Mrs. Ann Saxman, associate director of the conservation district and an enthusiastic conservationist. Mrs. Saxman realized her dream with the help of more than 50 volunteers and with funds provided by the district and a Latrobe industrial firm. The booklet covers every aspect of environmental problems and includes the names, addresses, and telephone numbers of organizations and agencies that can help solve the problems. It raises questions about ecological conditions in the county and challenges the reader to research the problems by using the pertinent references listed in the directory.

The financial support for the center comes from public donations and from the county government. "Our largest donation

has been $100," says Mrs. Pollock. "We know that public support for the center will continue to grow as more and more people become acquainted with the services available."—CHARLES SLATON, *public information officer, SCS, Harrisburg, Pennsylvania.* ♦

Giving nature a helping hand

Hunters in Lancaster County are in for more fun and sport as the Pennsylvania Game Commission speeds up its wildlife habitat improvement program in the area. Bird watchers, hikers, and other lovers of the outdoors can also benefit.

The Soil Conservation Service has worked with the Pennsylvania Game Commission in developing conservation and management plans for three state game lands in the county. These lands, managed by William A. Griffie of the game commission, cover about 2,500 acres. The plans were developed during the winter of 1970 and the spring of 1971.

Griffie will use the conservation and management plans for scheduling habitat improvement work, planning equipment needs and personnel assignments, and in preparing a record of accomplishments on each game land. He also believes that division offices of the Pennsylvania Game Commission will be able to use the plans for budgetary purposes. Division personnel will know what habitat improvement work is planned for the coming year and then can establish costs and set priorities to accomplish the planned improvements.

One of the state game lands in the county, covering 96 acres, is managed primarily for pheasants and rabbits. Sixty-six acres are in cropland, laid out in contour strips with 17,500 feet of wildlife borders planted around the fields and along many of the contour strip boundaries. Additional parking has been provided in this area for visiting hunters and nature lovers.

On this state game land 1 mile north of Reinholds, Pa., wildlife borders have been planted along the edges of the contour strips.

The second game land, covering 2,285 acres of steep and rocky woodland, is managed for grouse, rabbit, squirrel, and deer. People who enjoy snowmobiling will have access to 7 miles of road marked and designated for this purpose. Game commission personnel have established 7,000 feet of cutback border; 134,000 additional feet are planned. Critical-area planting to benefit wildlife is planned for 17 acres, and grasses and legumes are to be established on 49 acres.

The third state game land is a 92-acre area of steep, wooded land managed for squirrel, rabbits, and deer. About 11,000 feet of cutback borders make up most of the planned improvements; part of these are already established. About 5,000 feet of access roads and 2,800 feet of recreation trails also are planned.

A small parking area and 2 acres of critical-area planting make up the remainder of the planned improvements.

Pennsylvania cares about its wildlife resources and is cooperating with other state and federal agencies to preserve or improve them not only for sportsmen—and sportswomen—but for all the people that love nature and the outdoors. The fact that the state game lands are getting better proves this.—B. FRANK LUCAS, *soil conservationist, SCS, Lancaster, Pennsylvania.* ♦

Recon . . .

The guest who came to dinner and settled down for good is still a pretty fair story—if the "guest" is a herd of buffalo and the dinner is 5,000 feet above sea level in Hawaii's Ka'u Soil and Water Conservation District. As part of an experiment to find a good use for a highland section of flatland on the cooperating Kahuku Ranch, the buffalo were airshipped from South Dakota 3 years ago. They've since been joined by other "guests"—mouflon mountain sheep, wild turkeys, and Chinese ringneck pheasants—in an effort that combines soil conservation, wildlife, and recreation values.

Unmanaged wild areas evolve plant communities unsuitable for elk, deer, and some other species, according to data gathered by wildlife biologists in Idaho. In the past, good elk range was created by wild fires that interrupted natural plant succession from shrubs and grasses to forest. These prime food items, vital for winter forage, are gradually crowded out by evergreen and other trees which are low in nutrients and develop under modern fire protection. Prescribed burning—not as yet permitted in wilderness areas—may be a way of helping to reverse the trend.

Orders from the White House. The poisoning of eagles, hawks, coyotes, falcons, and other predators on federal land has been banned by executive order, and the Departments of Agriculture, Defense, and Interior, and the Tennessee Valley Authority have been directed to regulate the use of snowmobiles and other off-road vehicles on federal lands.

Dry winter. A new housing complex was built for the Tachi Indians of Kings County, California, several years ago. Because the town was flooding every winter, SCS engineers were asked to design a drainage system for the town. Last winter, with only part of the system constructed, the town was free of floodwater. The Tachis anticipate completion of the drainage system this year.

The Pennsylvania Game Commission and private industry have joined in launching a pilot project to make more privately owned land available for public hunting. The project, called the Forest Wildlife Cooperative Program, will be similar to the Game Commission's Farm Game Cooperative Program, which opened nearly 2 million acres of private agricultural land to sport hunting. The Game Commission will provide an additional degree of protection to large forested tracts made available by owners for public hunting. Certain roads into or across the tracts will be closed to public usage and posted with Game Commission signs. The responsibility for enforcement of regulations governing the posted roads rests with the Game Commission.

Clear the air. To reduce air pollution the Florida Department of Pollution Control has established specific rules relating to open burning and frost-protection fires in citrus-growing areas. The Division of Forestry is responsible for authorizing virtually all open burning in rural areas. Burning cannot be allowed if it will pose a potential threat to human life; weather will be the determining factor when requests for night burning are made; and the Division of Forestry must be notified and consulted before any burning operations to clear land are made in a rural area or adjacent to or near forests, grass, woods, wild lands, or marshes.

Save that tree. California's East Bay Regional Park District is recycling planks from redwood picnic table tops that have been deeply carved by picnickers. About three-sixteenths of an inch is planed off the table planks in recycling them for further use. The cost is $1 a board plus $60 for the purchase of planer blades for refinishing the planks. The life of the tables has been extended by as much as 10 years, and the saving itself is estimated at $1,200 a year.

Junior board of supervisors. Through a program originated by the National Association of Conservation Districts, members of youth groups can participate in environmental control. Serving on junior boards in their local soil and water conservation districts, these young people help develop useful ecology programs. Future Farmers of America members serve as the core on many of the junior boards. They work with representatives from Boy Scouts, Girl Scouts, Campfire Girls, Boys' Clubs of America, Future Homemakers, Young Men's and Young Women's Christian Associations, the Audubon Junior Program, and other youth organizations.

No-till pays. The 1970-71 Cooperative Extension Service progress reports indicate that each year more acres of corn, soybeans, sorghums, and other crops are produced either by the no-tillage or minimum tillage systems of crop production. These systems reduce soil erosion, cut labor and production costs, and save needed soil moisture. Arkansas, Iowa, Kentucky, Maryland, North Carolina, South Carolina, Tennessee, and Virginia report big increases in no-tillage or minimum tillage acreage.

Review

Engineering Formulas. By Kurt Gieck. *1972. McGraw-Hill Book Company, New York, N.Y. 384 pp., illus. $8.50*

Engineering Formulas offers a pocket-size guide providing engineers and scientists with important technical and mathematical formulas in a brief, clear, and handy format. Included are tables of measurements, areas, solid bodies, trigonometry, analytical geometry, special functions, differential calculus, and statistics. Also provided are formulas of kinematics, dynamics, hydraulics, head strength, machine parts, electrical engineering, optics, and chemistry.

Containing more than 1,500 formulas and about 300 diagrams, the book is printed on one side of its pages only, providing ample space on facing pages for additional notes.

Bark Mulch: Natural Artistry Around Your House. *1972. USDA Forest Service NE-INF-11. [20] pp., illus. in color.* Suggests ways of using forest tree bark mulch on flower beds, around trees and shrubs, on walkways, in playgrounds—anywhere that nature's versatile material can be put to work.

All Around You, an Environmental Study Guide. *1971. U.S. Dept. of the Interior, Bureau of Land Management. 126 pp., illus. $1.50.* For small children, this publication introduces environmental awareness through experiments in seeing, feeling, smelling, hearing, and tasting; for more advanced students, it relates environmental studies to civics studies. It includes study units that can be applied in the schoolyard, the student's own backyard, or in any available outdoor area. Urban as well as rural outdoor settings are covered.

Wildlife for Tomorrow. By Donald H. Wolfe. *1972. USDA Program Aid 989. 28 pp., illus. in color. $0.60.* The abundance of game, fur animals, and fishes aided the pioneers and settlers in establishing themselves in the new land. And as successive waves of new immigrants swept the continent, much of the eastern forested region and the continental grasslands disappeared before the ax and the plow. The farming and cattle industries and the need for timber changed the landscape and living environment for many kinds of wildlife. Many species adapted to the landscapes and flourished; others diminished; some became extinct. Legislation to prohibit the wanton destruction of wildlife was passed in 1900, 1929, 1937, and 1950. Small game and big game now abound in National Forests and National Grasslands; these areas have helped to save the habitat of rare and endangered birds, animals, reptiles, amphibians, and fishes. A list and some colored photographs of these rare and endangered species appear in the back of the book.

Regulation of Flood Hazard Areas to Reduce Flood Losses. *1971. U.S. Water Resources Council Vol. 1, Pts. I-IV. 578 pp. $2.50.* Report, developed under the auspices of the Water Resources Council with the cooperation of a number of agencies, organizations, and individuals, deals with the regulation of land and water areas by state and local government to minimize flood losses and presents draft statutes and local ordinances for regulation of land uses in riverine and coastal flood hazard areas.

Bureau of Mines Research Programs on Recycling and Disposal of Mineral-, Metal-, and Energy-Based Solid Wastes. By Charles B. Kenahan and Einar P. Flint. *[1971]. U.S. Dept. of the Interior Inf. Circ. 8529. 53 pp., illus.* Summary of research on extracting mineral, metal, and energy values from urban refuse; upgrading and recycling automotive and related ferrous and nonferrous scrap; utilizing and stabilizing mine, mill, and smelter wastes; and recovering and reusing values from industrial waste products. Accompanied by an extensive bibliography of related publications.

USDAHL-70 Model of Watershed Hydrology. By H. N. Holtan and N. C. Lopez. *1971. USDA Tech. Bull. 1435. 84 pp., illus. $0.75.* The hydrologic model presented here is the beginning of an effort to express watershed hydrology as a continuum. Designed to serve the purposes of agricultural watershed engineering, the mathematical model is a series of empiricisms selected to provide a mathematical continuum from ridgetop to watershed outlet in terms of input information readily available to the analyst.

Trees of the Forest, Their Beauty and Use. *Rev. 1971. USDA PA 613. 24 pp., illus. $0.25.* The story of growing trees and timber in the 154 National Forests in the United States.

Your Environment: Air, Air Pollution and Weather. By Collins M. Henson. *1972. The Interstate Printers and Publishers, Danville, Ill. $4.95.* The purpose of this book is clear: to provide young people with an understanding of the element most necessary to man's survival—the air he breathes. Written specifically for junior high and beginning high school students, the book gives students an opportunity to begin with basic facts and proceed through complex processes, thus building a knowledgeable background in the area of air, weather, and man's use and misuse of his environment. Some of the subjects covered are air pressure, air and its parts, weather, wind belts, weather makers, thunderstorms, precipitation, tornadoes and hurricanes, cyclones, weather symbols, and man and the weather.

Water Well Manual. By Ulric P. Gibson and Rexford D. Singer. *1972. Premier Press, Berkeley, Calif. (P.O. Box 4428). Illus. $5.50.* The book covers the fundamentals of the occurrence and movement of ground water; the location, design, construction, and maintenance of water wells; pumping equipment; and sanitary protection of ground-water supplies.

Chemical Composition of Native Grasses in Central Oklahoma from 1947 to 1962. By George R. Waller, R. D. Morrison, and A. B. Nelson. *1972. Oklahoma State University, Agricultural Experiment Station Bull. B-697. 14 pp., illus.* Monthly samples from each of four species of predominant native tall grasses (big bluestem, little bluestem, indiangrass, and switchgrass) obtained during a 15-year period were chemically analyzed, and the major constituents important to the nutrition of beef cattle subsisting year-long on native range were determined. This publication reports a summary of the results.

Fact Book of U.S. Agriculture. By Glenn White. *1972. USDA Misc. Pub. 1063. 87 pp. $0.45.* Narrative summary of United States agriculture as a whole. Among the things discussed are farm production supplies, the farming operation, food marketing, agricultural services, and improving the rural social environment. The appendix includes summaries of state agriculture, a glossary, and selected references.

Here's What We Did, Community Leaders Tell About RC&D Projects. *USDA Soil Conservation Service. 1971. [36] pp., illus.* In this collection of articles, reprinted from the November and December 1971 issues of SOIL CONSERVATION, local leaders of resource conservation and development (RC&D) projects tell how community action has brought about better use and care of natural resources thereby improving the lives of people.

Vocational Instructional Materials for Agriculture Available From Federal Agencies. *1971. U.S. Government Printing Office, Supt. of Documents. [124] pp. $1.50.* Lists publications, reports, and periodicals on agricultural production, mechanics, products, and resources, and ornamental horticulture and forestry. It also lists related career education materials.

Guide for Interpreting Engineering Uses of Soils. *1971. USDA Soil Conservation Service. 87 pp., illus. $2.* Outlines the data to be included in the engineering section of soil surveys, shows methods for preparing and presenting engineering data in the engineering tables, and sets forth instructions for writing the text of the engineering section.

Foreign Bacterial and Fungus Diseases of Food, Forage, and Fiber Crops: An Annotated List. By ALICE J. WATSON. *1971. USDA Agr. Hbk. 418. 11 pp. $1.*

Preparing Herbarium Specimens of Vascular Plants. By C. EARLE SMITH, JR. *1971. USDA Agr. Information Bull. 348. 29 pp., illus. $0.40.* This is a guide to preparing herbarium specimens, including hard-to-prepare specimens such as floating or submerged plants; plants with large parts; succulent aerophytes, mesophytes, and hydrophytes; plants with deliquescent or fragile flowers; plants of the pineapple and the palm families; bamboo plants; screwpines; and aborescent plants.

Agricultural Statistics, 1971. *U.S. Department of Agriculture. 639 pp. $2.75 (Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402).*

Effects of Management Practices on Johnsongrass for Hay Production. By A. E. SPOONER, WILL R. JEFFERY, AND HERBERT J. HUNEYCUTT. *1971. University of Arkansas Agr. Expt. Sta. Bull. 769 (Fayetteville). 19 pp., illus.* Three experiments were conducted at the Southwest Branch Experiment Station at Hope, Ark., to study the effects of physiological stage of maturity of johnsongrass when cut, and N, P, and K levels of fertilization on yield, chemical composition, and longevity of stand. This bulletin gives the results.

The Possible Dream, Resource Conservation and Development. By WALLACE L. ANDERSON AND CAROLYN JOHNSTON. *1972. Reprinted from "1971 Yearbook of Agriculture." 8 pp., illus.* Training, employment, increase in industry, flood prevention, sediment reduction, recreation—all the result of resource conservation and development.

Genetic and Cytological Studies With Camellia and Related Genera. By WILLIAM L. ACKERMAN. *1971. USDA Tech. Bull. 1427. 115 pp., illus. $0.70.* This study was made to investigate the compatibility relationships of various Camellia species and species of related genera by obtaining interspecific and intergeneric hybrids and to determine the chromosome numbers of species and hybrids, the chromosome morphology of Camellia species where possible, and the breeding potential of interspecific and intergeneric hybrids. Twenty species were used as parents for interspecific crosses in Camellia, resulting in 459 hybrids from 106 combinations.

Meetings

May

7–14 Soil Stewardship Week
12 Family Camping Federation, American Camping Congress, Chicago, Ill.
14–17 Annual Northeast Wildlife Conference, Allenville, N.Y.
14–18 National Council of State Garden Clubs, Inc., Cleveland, Ohio
17–June 3 International Commission on Irrigation and Drainage, Varna, Bulgaria
18–19 American Concrete Pipe Association, Denver, Colo.
21–27 Urban Land Institute, 4th Annual Land Use Symposium, Toronto, Canada
23–25 Pollution Engineering and Equipment Exposition Conference, Chicago, Ill.
28–30 American Seed Trade Association, Portland, Oreg.

June

4–7 National Watershed Congress, San Diego, Calif.
5–16 United Nations Conference on the Human Environment, Stockholm, Sweden
8–12 General Federation of Women's Clubs, Denver, Colo.
13–18 American Water Works Association, Chicago, Ill.
14–16 Pollution Control Show and Conference, Toronto, Canada
18–22 Air Pollution Control Association, Miami Beach, Fla.
19–21 American Plywood Association, Gearhart, Oreg.
19–23 "Watershed Hydrology," National Symposium, Ft. Collins, Colo.
25–28 American Society of Landscape Architects, Philadelphia, Pa.
25–28 National Association of Counties, Washington, D.C.
25–30 National Education Association, Atlantic City, N.J.
27–30 American Society of Agricultural Engineers, Hot Springs, Ark.

July

2–7 National Environmental Health Association, N.Y., N.Y.
17–21 American Association of Nurserymen, Inc., Washington, D.C.
19–21 The Izaak Walton League of America, Chicago, Ill.
19–21 Forage Fertilization Symposium, Muscle Shoals, Ala.
23–27 National Association of Business and Professional Women, Atlantic City, N.J.
26–27 Great Plains Agricultural Council, Lincoln, Nebr.

UNITED STATES
GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON, D. C. 20401

OFFICIAL BUSINESS
PENALTY FOR PR

SC-JAN
UNIVERSITY MICROFILMS
SERIALS SECTION
300 NORTH ZEEB RD
ANN ARBOR MI 48106

U.S.MAIL

POSTAGE AND FEES PAID
U. S. GOVERNMENT PRINTING OFFICE

From the **Administrator:**

Helping dispose of animal wastes

A single steer produces about 75 pounds of manure each day. A dairy cow can produce even more.

Multiply that by 117.9 million head of dairy and beef cattle in the United States.

Add to that the waste from 18.4 million sheep and lambs, 62.9 million swine, and 900 million chickens, turkeys, and other fowl and you can get some idea of the immense amounts of animal wastes that must somehow be disposed of by American farmers and ranchers.

Much of this is recycled naturally on crop, range, and pasture land. But the growing concentration of animal production into large feedlots increases both the problem of waste disposal and the pollution potential involved in these concentrated amounts of animal wastes.

Many different people and agencies are testing new disposal and recycling methods. Our agency knows some of the answers, we are working to refine others, and we are continuing to look to the research agencies and farm and feedlot operators for new developments in this field.

The feedlot operators are well aware of the fact that they must manage their wastes to meet environmental quality standards, just as factories and communities must. Farm waste-management systems are becoming a part of more and more soil and water conservation plans. These systems are vital to the protection of the nation's soil, water, and air, and SCS intends to continue to give assistance to conservation districts in meeting the growing demand.

Why is SCS asked for help? I think it is because of our expertise in soil science, plant materials management, and on-land application of conservation practices. We are still in the pioneering stage, but it appears that the safest thing to do with animal wastes is to recycle them through soil and its plant cover. We certainly want to prevent discharge of pollutants from feedlots or liquid-waste holding ponds into streams or underground water supplies.

While alternative methods of waste disposal, such as composting, dehydration, and incineration are technically feasible, their use in the immediate future will be limited because of high cost and limited demand for products made from animal wastes.

In providing assistance, our people will have to recognize the limits of our role in the animal-waste field. SCS is not a regulatory agency. We are a service agency, a technical agency, with a responsibility for helping land users to solve problems of soil and water conservation, including those of pollution abatement. We will have to keep in mind the need to cooperate with other federal agencies having responsibilities in this field as well as with appropriate state and local agencies. Yet, the ultimate responsibility for adhering to conservation environmental standards falls to the land owner or operator himself.

Kenneth E. Grant